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# New records of leafrollers reared in Azerbaijan (Lepidoptera: Tortricidae)

Sheyda MAHARRAMOVA & Hamit AYBERK

A b s t r a c t : 17 species of tortricid moths had been defined for the eastern parts of Azerbaijan during the years of 1994-2015. Five of these, *Ptycholoma lecheana* (LINNAEUS, 1758), *Cacoecimorpha pronubana* HÜBNER, 1799, *Eudemis profundana* ([DENIS & SCHIFFERMÜLLER], 1775), *Hedya salicella* (LINNAEUS, 1758), and *Epinotia demarniana* (FISCHER VON RÖSLERSTAMM, 1840), are new to the Azerbaijan fauna; two of them (*Cacoecimorpha pronubana* and *Epinotia demarniana*) are new to the Caucasian fauna, as well. Leafrollers were collected in the larval and pupal stage from March to September on their food plants according to the sampling methods. The early stages were kept in the laboratory until adult emergence, after which they were killed and pinned. Data on newly recorded leafrollers are given in the text including species name, collection area, coordinates of area, data of collection, food plants on which they were recorded, and sex of specimen(s).

K e y w o r d s : Tortricids, damage, host plants, Azerbaijan, fauna.

## Introduction

Tortricidae, commonly known as leafrollers, are one of the most diverse families in the Microlepidoptera. The number of leafroller species in countries bordering Azerbaijan differs among the adjacent regions: 469 species are recorded from Turkey (KOÇAK & KEMAL 2012), 145 species from Iran (KOÇAK & KEMAL 2012), and 139 species from Georgia (ESARTIA 1988). A total of 128 species of leafrollers has been reported for Azerbaijan (MAHARRAMOVA 2016).

Field studies have been conducted between 1994 and 2015 focused on the tortricid fauna of eastern Azerbaijan: rearing 17 species of tortricid moths. Five of these, *Ptycholoma lecheana* (LINNAEUS, 1758), *Cacoecimorpha pronubana* HÜBNER, 1799, *Eudemis profundana* ([DENIS AND SCHIFFERMÜLLER], 1775), *Hedya salicella* (LINNAEUS, 1758), and *Epinotia demarniana* (FISCHER VON RÖSLERSTAMM, 1840), are new to the Azerbaijan fauna; two of them (*Cacoecimorpha pronubana* and *Epinotia demarniana*) are new to the Caucasian fauna, as well.

## Materials and Methods

R e s e a r c h A r e a : Gonagkend in the north-east; Absheron-Gobustan in the east and Lankaran region in the south east have been selected as the study areas belonging to

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the eastern parts of Azerbaijan (Fig. 1). In the southeast and northeast areas, the plant communities consist of native vegetation such as *Quercus castaneifolia*, *Q.longires*, *Crataegus caucasica*, *Parrotia persica*, *Ulmus carpinifolia*, *Salix kuznetsovii*, *Populus hyrcana*, *Fraximus excelsior*, *Tilia caucasica* and etc.; in the eastern areas dominated ornamental plants such as *Maclura romifera*, *Amorpha fruticosa*, *Ligustrum lucidum*, *Laurus nobilis*, *Colutea arborescens* and etc. introduced from around the world.

M e t h o d s : Leafrollers were collected in the larval and pupal stage from March to September on their food plants according to the sampling methods of FASULATI (1971). All the specimens were kept in the reserves of Azerbaijan National Academy of Sciences, Institute of Zoology. The early stages were kept in the laboratory until adult emergence, after which they were killed and pinned. Nomenclature follows AARVIK et al. (2013) and ZICHA (2014).

A b b r e v i a t i o n s :
penins ..... peninsula
settl..... settlement
v ..... village
s.l..... sea level
a.s.l. ..... above sea level
b.s.l..... below sea level

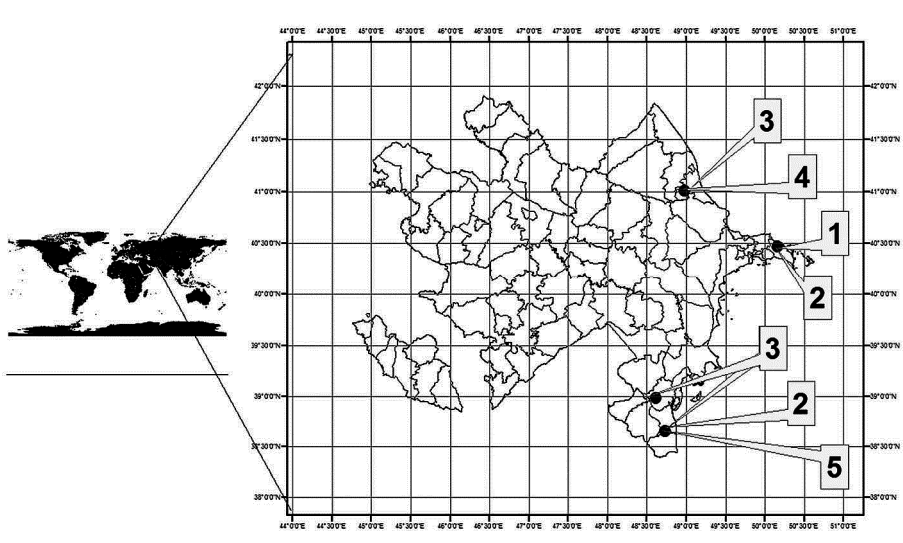


**Fig. 1**: Distribution of leafrollers in Eastern Azerbaijan:
(**1**) *Ptycholoma lechaena* (LINNAEUS, 1758)
(**2**) *Cacoecimorpha pronubana* (HÜBNER, 1800)
(**3**) *Eudemis profundana* (DENIS & SCHIFFERMÜLLER, 1775)
(**4**) *Hedya salicella* (LINNAEUS, 1758)
(**5**) *Epinotia demarniana* (FISCHER von RÖSLERSTAMM, 1840)

## Results and Discussion

The family Tortricidae includes three subfamilies - Tortricinae, Olethreutinae and Chlidanotinae. 17 species belonging to 14 genera and two subfamilies: Tortricinae (9

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species) and Olethreutinae (8 species) have been reared in laboratory conditions. Of the 17 species, five (*Ptycholoma lecheana* (L.), *Cacoecimorpha pronubana* HUB., *Eudemis profundana* ([DEN.AND SCHIFF.), *Epinotia demarniana* (FISCH.), *Hedya salicella* (L.) are new to the Azerbaijan fauna, two of which (*Cacoecimorpha pronubana*, *Epinotia demarniana*) are new to the Caucasian fauna (Table 1).

Data on newly recorded leafrollers are given below including species name, collection area, coordinates of area, data of collection, food plants on which they were recorded, and sex of specimen(s). Information about distribution of leafrollers was taken from AARVIK et al. (2013).

## Tortricinae

### Archipini PIERCE & METCALFE 1922

*Ptycholoma lecheana* (LINNAEUS, 1758)
*Ptycholoma lecheanum* (LINNAEUS, 1758)
*Phalaena* (*Tortrix*) *lecheana* LINNAEUS, 1758
*Tortrix circumclusana* CHRISTOPH, 1881
*Ptycholoma circumclusana* CHOI et al., 2004
*Cacoecia magnificana* HERRICH-SCHIFFER, 1861
*Cacoecia lecheana nipponica* OKA, 1925
*Orthotaenia obsoletana* OKA, 1925
*Ptycholoma obsoletana* STEPHENS, 1834

Specimens examined. Absheron penins., Mardakan settl. (40.490051° 50.160848°, 6 m a.s.l.), 22.05.2001, *Quercus castaneifolia*, 2♀♀ Absheron penins., Mardakan settl. (40.487881° 50.159309°, 4 m a.s.l.), 23.05.2001, *Malus sylvestris*, 3♀♀ Absheron penins., Mardakan settl. (40.491343° 50.165834°, 1 m b.s.l.), 27.05.2013, *Quercus castaneifolia*, 3♀♀

Host plants. *Acer negundo* (Aceraceae) (YASUDA 1975), *Quercus robur* L. (Fagaceae) (DISQUE 1908), *Fraxinus* sp. (Oleaceae) (HANNEMANN 1961), *Abies* sp., *Larix decidua* (Pinaceae) (BRADLEY et al. 1973), *Crataegus* sp. (HANNEMANN 1961), *Malus domestica* (SYLVÉN 1958), *Malus sylvestris* (BRADLEY et al. 1973), *Prunus divaricata*, *P.spinosa* (BUDASHKIN 2009), *Prunus* sp. (BRADLEY et al. 1973), *Sorbus* sp. (Rosaceae) (HANNEMANN 1961), *Populus* sp. (BRADLEY et al. 1973), *Salix* sp. (Salicaceae) (BRADLEY et al. 1973), *Tilia* sp. (Tiliaceae), *Ulmus* sp. (Ulmaceae) (HANNEMANN 1961).

Distribution. Europe (Albania, Austria, Belgium, Bosnia & Herzegovina, Britain, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Macedonia, Norway, Poland, Portugal, Romania, Russia (except Northern parts of Russia), Asia (Asian parts of Turkey, Caucasian countries, Lebanon, Georgia, Arabian peninsula, Armenia, Syria, Jordan, Israel, Iran, Iraq, Korea, China, Japan), Africa (Sinai Peninsula-Egypt).

Remarks. This species was collected in larval stage. Larvae are greenish. Early instars skeletonize leaves; later instars damage buds, flowers, and newly emerged leaves. Larvae attach young leaves by silk and feed inside. In early spring larvae damage buds by eating them from inside. Then they join together several buds, flowers, and/or young leaves with silk. Pupae are black or dark brown. The pupa develops within 9-12 days. Adults emerge in late May or early June. Eggs are yellowish-green. Egg clusters contain 15 to 18 eggs. New to Azerbaijan fauna.

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This species has one generation throughout its range. Second and third instars overwinter in fairly dense white cocoons in cracks of the bark of trunks and branches, under leaf litter, fixed to the cortex, as well as under dry bud scales on the branches. Overwintered larvae hatch from their winter cocoons in April and May. In May and early June they gnaw blossoming buds and twisted on treetops leaves and flowers. Older instar larvae can gnaw unripe apples and other fruits outside. Pupate in feeding places or in the crevices of trunks. Adults hatch from the end of May to July. Eggs are laid on the leaves, sometimes along the veins (KUZNETSOV 1994).

### *Cacoecimorpha pronubana* HÜBNER, 1799

*Tortrix pronubana* HÜBNER, [1796-1799]
*Tortrix ambustana* FRÖLICH, in GEYER & HÜBNER, 1830
*Tortrix hermineana* DUPONCHEL, in GODART, 1834
*Tortrix herminiana* DUPONCHEL, in GODART, 1834
*Tortrix insolatana* LUCAS, 1848
*Tortrix musculana obsoletana* STRAND, 1901 (form)
*Tortrix perochreana* HERRICH-SCHÄFFER, 1856

S p e c i m e n s e x a m i n e d . Absheron penin., Mardakan settl. (40.488998° 50.159894°, 6 m a.s.l.), 06.06.1997, *Laurus nobilis*, 1♀; Absheron penin., Mardakan settl. (40.490087° 50.163831°, 8 m a.s.l.), 12.06.2000, *Laurus nobilis*, 1♀; Lankaran district, Hirkan National Park (38.607268° 48.783872°, 97 m a.s.l.), 27.06.2003, *Ligustrum lucidum*, 2♂♂; Lankaran district, Hirkan National Park (38.608021° 48.803839°, 103 m a.s.l.), 18.06.2008, *Ligustrum lucidum*, 1♂.

H o s t p l a n t s . Larvae are polyphagous, feeding on more than 160 species of plants in 42 families (GILLIGAN & EPSTEIN 2014): *Aegopodium podagraria* (Apiaceae) (ALLEN 1992), *Vinca* sp. (Apocynaceae) (DUGDALE et al. 2005), *Hieracium* sp. (Asteraceae) (BRADLEY et al. 1973), *Brassica* sp. (Brassicaceae) (GARDINER 1982), *Dianthus* sp. (Caryophyllaceae) (BRADLEY et al. 1973), *Euonymus japonicus* (BRADLEY et al. 1973; EMMET 1992; NIELSEN 1993), *Cupressocyparis leylandii* (Cupressaceae) (SOKOLOFF 1983), *Hippophae rhamnoides* (Elaeagnaceae) (BRADLEY et al. 1973), *Vaccinium corymbosum* (Ericaceae) (EASTERBROOKE 1986), *Vaccinium* sp. (Ericaceae) (CALVO AND MOLINA 2003), *Euphorbia amygdaloides* (Euphorbiaceae), *Robinia pseudoacacia* (Fabaceae), *Laurus nobilis* (Lauraceae) (BRADLEY et al. 1973), *Narcissus* sp. (Liliaceae) (ALLEN 1987), *Ligustrum* sp. (Oleaceae), *Fuchsia* sp. (Onagraceae) (BRADLEY et al. 1973), *Pinus halepensis* (Pinaceae) (CASTRESANA et al.1996), *Punica granatum* (Punicaceae) (VASILYEVA 1982), *Fragaria* sp. (Rosaceae) (BRADLEY et al. 1973), *Citrus reticulata* (Rutaceae) (BRADLEY 1987), *Lycopersicon esculentum* (Solanaceae) (BRADLEY et al. 1973), *Vitis* sp. (Vitaceae) (JACOBS 1978).

D i s t r i b u t i o n . North America (Oregon state of U.S.A.), Europe (Albania, Austria, Belgium, Bosnia and Herzegovina, Britain, Cyprus, France (Corsica island), Greece, Hungary, Ireland, Balearic Is., Italy, Malta, Portugal, Romania, Sicily, Slovenia, Spain, Switzerland, The Netherlands (Madeira island), Africa (Sinai Peninsula (Egypt)), Asia (Asian Turkey, Caucasian countries, Lebanon, Syria, Jordan, Israel, Arabian peninsula, Iran, Iraq).

R e m a r k s . This species was collected as larvae in the Eastern and South-Eastern territories of Azerbaijan. The yellow or brownish-green larvae attach 2 or 3 leaves together with silk and eat the parenchyma tissue on the inside of the leaves. At the end of 3rd instar, the larvae cover the leaves with a silken web.

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Larvae of all instars can overwinter in fruit on the tree, in fallen fruit, or in fallen leaves. They continue to feed in the winter when the weather is favorable, especially on evergreens. Pupation occurs in a silken cocoon on the food plant. Adults fly from late June until July. Eggs are light green, pupae are blackish brown. The number of generations varies from 2 to 6 depending upon latitude (KUZNETSOV 1994). Newly reported for the Caucasian fauna.

**O l e t h r e u t i n a e**

**Olethreutini WALSINGHAM 1895**

*Eudemis profundana* ([DENIS & SCHIFFERMÜLLER], 1775)
*Tortrix profundana* [DENIS & SCHIFFERMÜLLER], 1775
*Tortrix aethiopiana* HAWORTH, [1811]
*Tortrix alphonsiana* DUPONCHEL, in GODART, 1834
*Paedisca nebulana* DONOVAN, [1806]
*Eudemis profundana f.obscurata* GIBEAUX & LUQUET, 1998
*Eudemis profundana f.satans* GIBEAUX & LUQUET, 1998
*Phalaena* (*Tinea*) *triangulella* GOEZE, 1783
*Tortrix wellensiana* HÜBNER, [1811-1813]

S p e c i m e n s e x a m i n e d : Azerbaijan: Lankaran district, v.Alekseyevka (38.675763° 48.803327°, at s.l.), 19.05.1995, *Quercus castaneifolia*, 2♂♂ 4♀♀; Lankaran district (38.678006° 48.781246°, 66 m a.s.l.), 10.06.1999, *Quercus castaneifolia*, 12♂♂ 2♀♀; Siyazan district, v.Galaalty (41.083321° 49.022541°, 384 m a.s.l.), 11.05.2001, *Quercus iberica*, 2♂♂; Lankaran district, Hirkan National Park (38.676011° 48.779312°, 104 m a.s.l.), 25.05.2002, *Quercus castaneifolia*, 3♀♀; Lankaran district (38.678197° 48.778540°, 116 m a.s.l.), 09.06.2003, *Quercus castaneifolia*, 2♂♂; Siyazan district, v.Galaalty (41.084228° 49.022972°, 389 m a.s.l.), 12.05.2005, *Quercus iberica*, 1♂ 6♀♀; Lankaran district, v.Avrora (38.661756° 48.802450°, 2 m a.s.l.), 12.05.2006, *Quercus castaneifolia*, 5♂♂ 5♀♀; Siyazan district, v.Galaalty (41.084182° 49.021693°, 345 m a.s.l.), 02.06.2008, *Quercus iberica*, 11♂♂ 7♀♀; Lenkeran district, v.Alekseyevka (38.675763° 48.803327°, at s.l.), 28.05.2009, *Quercus castaneifolia*, 9♀♀; Siyazan district, v.Galaalty (41.084243° 49.021411°, 333 m a.s.l.), 22.05.2010, *Quercus iberica*, 6♀♀; Siyazan district, v.Galaalty (41.083653° 49.021133°, 330 m a.s.l.), 10.05.2011, *Quercus iberica*, 11♂♂ 12♀♀; Masally district, v.Geyechol (39.005293° 48.715136°, 10 m b.s.l.), 19.05.2011, *Quercus castaneifolia*, 12♂♂ 7♀♀; Lankaran district, Hirkan National Park (38.653407° 48.758074°, 104 m a.s.l.), 25.05.2011, *Quercus castaneifolia*, 5♂♂ 14♀♀; Siyazan district, v.Galaalty (41.083647° 49.022791°, 387 m a.s.l.), 14.05.2012, *Quercus iberica*, 32♂♂ 24♀♀; Masally district (38.977001° 48.602869°, 98 m a.s.l.), 22.05.2012, *Quercus castaneifolia*, 18♂♂ 12♀♀.

H o s t p l a n t s : Main food plant is oak**.** However, the species is found on different forest trees and bushes: *Quercus aliena* (KIM & SOHN 1999), *Quercus pubescens* (BUDASHKIN 2009), *Quercus robur* (DISQUE 1908), *Quercus serrata*, *Malus toringo*, *Prunus padus* (KAWABE 1982), *Prunus ssiori* (Rosaceae) (BAE & SAKAMAKI 1995).

D i s t r i b u t i o n : Europe (Albania, Austria, Belgium, Britain, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Macedonia, Norwich, Poland, Portugal, Romania, Russia (except Russia North and Russia Northwest), Sardinia, Sicily, Slovakia, Slovenia, Spain, Sweden, Switzerland, The Netherlands, Ukraine, former Yugoslavia), Africa (Sinai Peninsula (Egypt), Asia (Asian Turkey, Caucasian Russian republics, Arabian peninsula, Lebanon, Syria, Israel, Jordan, Iran, Iraq).

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R e m a r k s : Larvae and pupae were collected in North-Eastern and South-Eastern Azerbaijan on different forest plants. Last instar larvae are dark green, very active, and 2.0-2.3 cm in length. Caterpillars damage *Quercus castaneifolia* and *Quercus iberica*.

Caterpillars are found in the web of leaves or young shoots twisted together. Young caterpillars feed on buds, then they move on to the leaves (BRADLEY et al. 1979). They pupate in a leaf roll along the main vein of the leaf (KUZNETSOV 1994) or sometimes on the ground amongst leaf litter in June (BRADLEY et al. 1979).

Newly reported for Azerbaijan fauna.

Olethreutinae: Olethreutini WALSINGHAM 1895

***Hedya salicella* (LINNAEUS 1758)**

S p e c i m e n s e x a m i n e d . Siyazan district, v.Galaalty (41.084632° 49.022847°, 383 m a.s.l.), 14.05.2001, *Salix kuznetsovii*, 1♂; Siyazan district, v.Galaalty (41.083933° 49.022913°, 388 m a.s.l.), 18.05.2005, *Salix kuznetsovii*, 2♂♂ 3♀♀; Siyazan district, v.Galaalty (41.084730° 49.021817°, 345 m a.s.l.), 09.05.2007, *Populus hibrido*, 2♀♀; Siyazan district, v.Galaalty (41.084811° 49.021521°, 332 m a.s.l.), 23.05.2010, *Salix kuznetsovii*, 6♂♂ 4♀♀, *Populus hibrido*, 3♂♂ 2♀♀; Siyazan district, v.Galaalty (41.083030° 49.022369°, 385 m a.s.l.), 03.05.2012, *Salix kuznetsovii*, 4♀♀.

H o s t p l a n t s . *Populus nigra*, *P. tremula* (BRADLEY et al. 1987; JAROS and SPITZER 2002), *Populus* (BUDASHKIN 2009), *Salix alba*, *S. atrocinerea*, *S. caprea* (BRADLEY et al. 1987), *S. cinerea* (Salicaceae) (JAROS & SPITZER 2002).

D i s t r i b u t i o n . Europe (Albania, Austria, Belgium, Bosnia and Herzegovina, Britain, Bulgaria, Czech Republic, Danish mainland, Estonia, Finland, France, Germany, Greece, Hungary, Italy (Sardinia island), Latvia, Lithuania, Luxembourg, Norwich mainland, Poland, Romania, Russia (except northern parts), Slovakia, Slovenia, Spain, Sweden, Switzerland, The Netherlands), Asia (Asian Turkey, Caucasian countries, Georgia, Armenia, Lebanon, Syria, Israel, Jordan, Arabian peninsula, Iran, Iraq) Africa (Sinai Peninsula (Egypt).

R e m a r k s . Larvae were collected in the North-Eastern territories of Azerbaijan, on the leaves of *Salix kuznetsovii* and *Populus hibrido* (Salicaceae). Adults emerged in late May and early June. Newly recored for the Azerbaijan fauna.

**O l e t h r e u t i n a e : Eucosmini MEYRICK, 1909**

***Epinotia demarniana* (FISCHER VON RÖSLERSTAMM, 1840)**

*Paedisca demarniana* FISCHER VON RÖSLERSTAMM, 1840

S p e c i m e n s e x a m i n e d . Lankaran district, Hirkan National Park (38.646542° 48.814932°, 14 m b.s.l.), 15.05.1995, *Alnus barbata*, 3♂♂; Lankaran district, Hirkan National Park (38.647164° 48.819530°, 19 m b.s.l.), 27.05.2001, *Alnus barbata*, 3♂♂ 1♀; Lankaran district, Hirkan National Park (38.646154° 48.819281°, 18 m b.s.l.), 01.06.2015, *Alnus barbata*, 2♀♀.

H o s t p l a n t s . *Alnus glutinosa* (BRADLEY 1987), *Betula pubescens* (Betulaceae) (DISQUE 1908), *Salix caprea* (Salicaceae) (BRADLEY 1987).

D i s t r i b u t i o n . Europe (Austria, Belgium, Britain, Czech Republic, Denmark, Estonia, Finland, France (Corsica), Germany, Hungary, Italy (Sardinia, Sicily), Latvia, Lithuania, Luxembourg, Norway, Poland, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Netherlands).

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R e m a r k s . Larvae were collected on *Alnus barbata* in the Hirkan National Park in Lankaran. Adults are on the wing from June to July. The larvae feed within the catkins of *Betula*, *Alnus* and *Salix caprea*. Pupation takes place on the ground in a cocoon in the leaf litter. Newly recorded for the Caucasian fauna.

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## Zusammenfassung

17 Wickler (Tortricidae) konnten im Zeitraum 1994 bis 2015 für den östlichen Teil Aserbaidschans nachgewiesen werden. *Ptycholoma lecheana* (LINNAEUS, 1758), *Cacoecimorpha pronubana* HÜBNER, 1799, *Eudemis profundana* ([DENIS & SCHIFFERMÜLLER], 1775), *Hedya salicella* (LINNAEUS, 1758) und *Epinotia demarniana* (FISCHER VON RÖSLERSTAMM, 1840) sind Erstnachweise für Aserbaidschan. Die einzelnen Wickler wurden im Raupen- und Puppenstadium an ihren Futterpflanzen gesammelt, bis zum Adultstadium gezüchtet und anschließend genadelt. Die Neunachweise wurden mit den vorhandenen Informationen in der vorliegenden Arbeit angeführt.

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**Tab. 1**. Trophic relations of leafrollers in eastern Azerbaijan.

| Leafrollers | New | Total | Imago hatching (%) | Mortality (%) | Collecting years | Host plants (by studying areas) | Physical-geographical regions |
|---|---|---|---|---|---|---|---|
| *Ptycholoma lecheana* (L.) | *Azerbaijan* | 8 | 37.5 | 62.5 | 2001, 2013 | *Quercus castaneifolia*<br>*Malus sylvestris* | East |
| *Cacoecimorpha pronubana* HUB. | *Caucasus* | 5 | 40 | 60 | 1997, 2000, 2003, 2008 | *Laurus nobilis*<br>*Ligustrum lucidum* | East<br>south-east |
| *Eudemis profundana* (DEN. et SCHIFF.) | *Azerbaijan* | 224 | 62.5 | 37.5 | 1995, 1999, 2001, 2002, 2003, 2005, 2006, 2008, 2009, 2010, 2011, 2012 | *Quercus castaneifolia*<br>*Quercus iberica* | south-east<br>north-east |
| *Hedya salicella* L. | *Azerbaijan* | 27 | 55.5 | 44.5 | 2001, 2005, 2007, 2010, 2012 | *Quercus iberica*<br>*Salix kuznetsovii*<br>*Populus hibrido* | north-east |
| *Epinotia demarniana* (FISCH.) | *Caucasus* | 18 | 16.6 | 83.4 | 1995, 2001, 2015 | *Alnus barbata* | south-east |